

CAFS partial ozone column data for in-flight validation of the AURA ozone products.

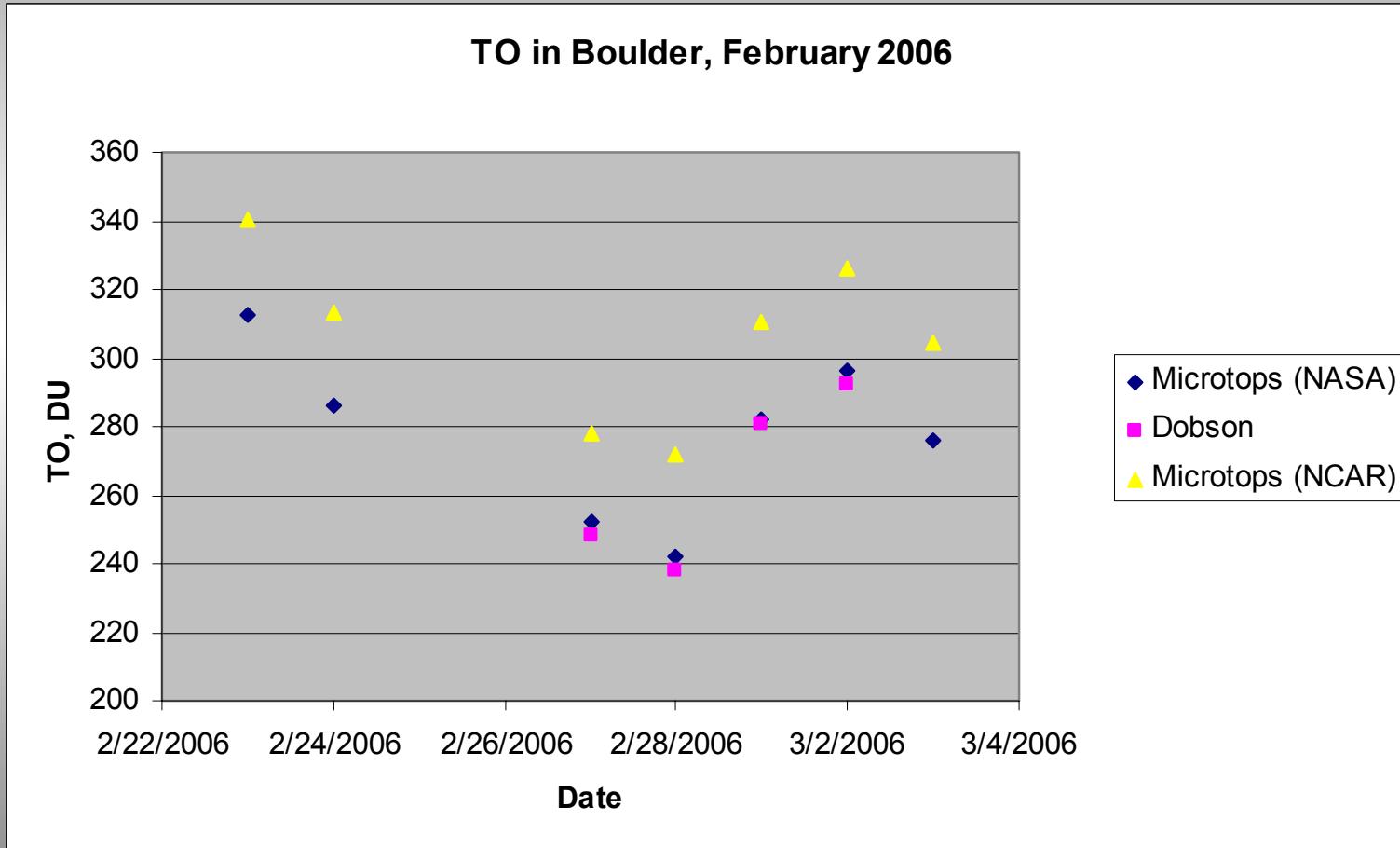
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CAFS validation

- Microtops ozone column measurements – multiple/per day, averages
- Ozone –sonde, launched close to the end of the flight
- In-situ ozone measurements (NOAA/CSD)
- Dobson (Boulder) after campaign

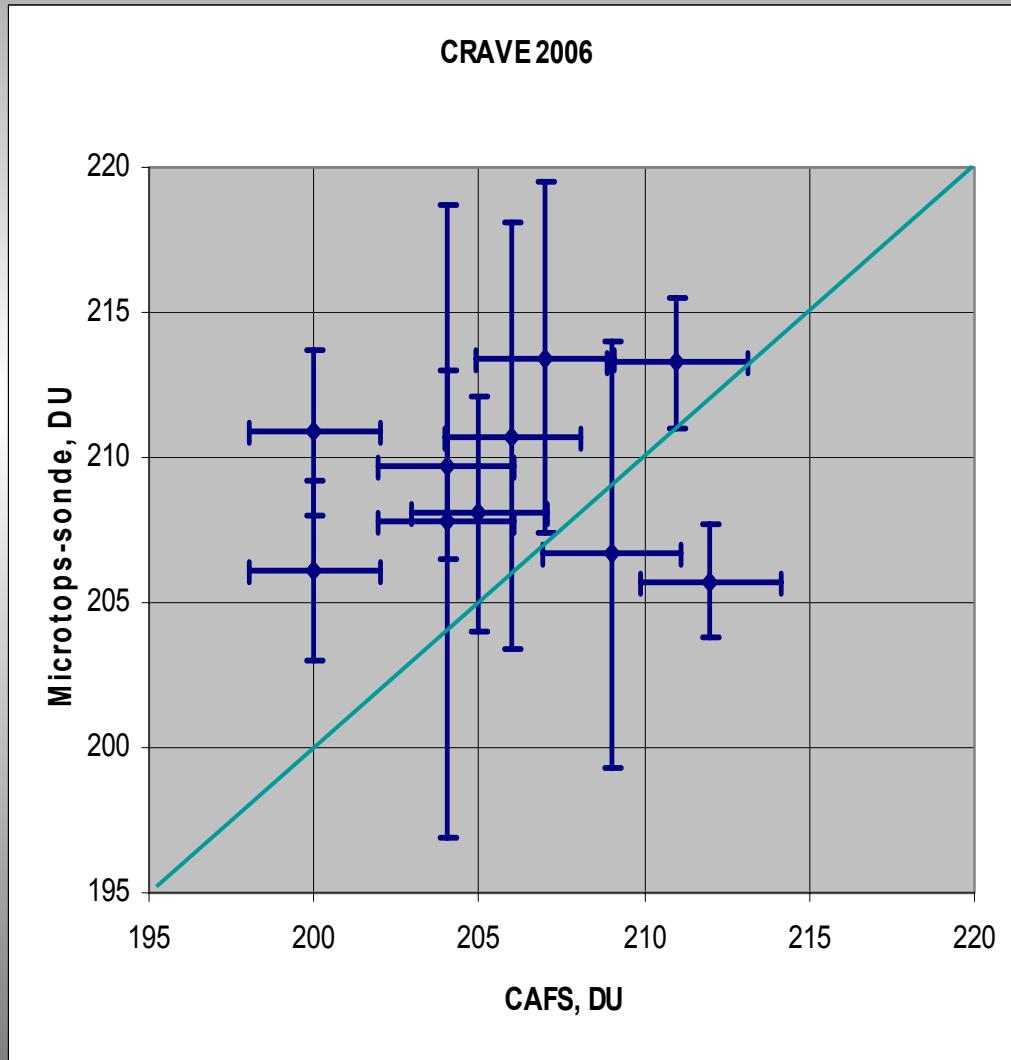
Boulder, 2006

NASA Microtops is about 1.3 % higher than Dobson



CAFS vs. Sonde/microtops

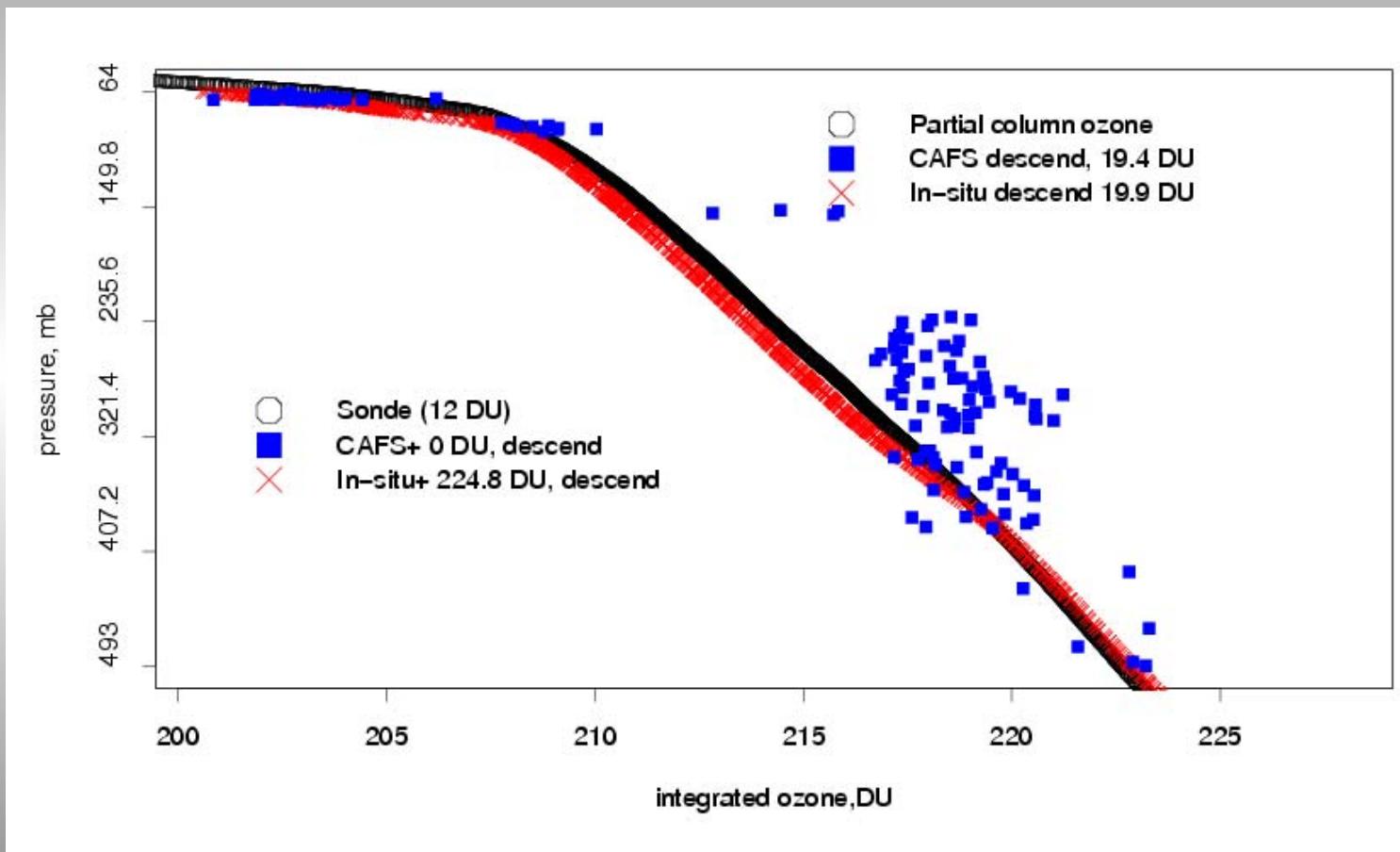
CRAVE 2006, ~19 km



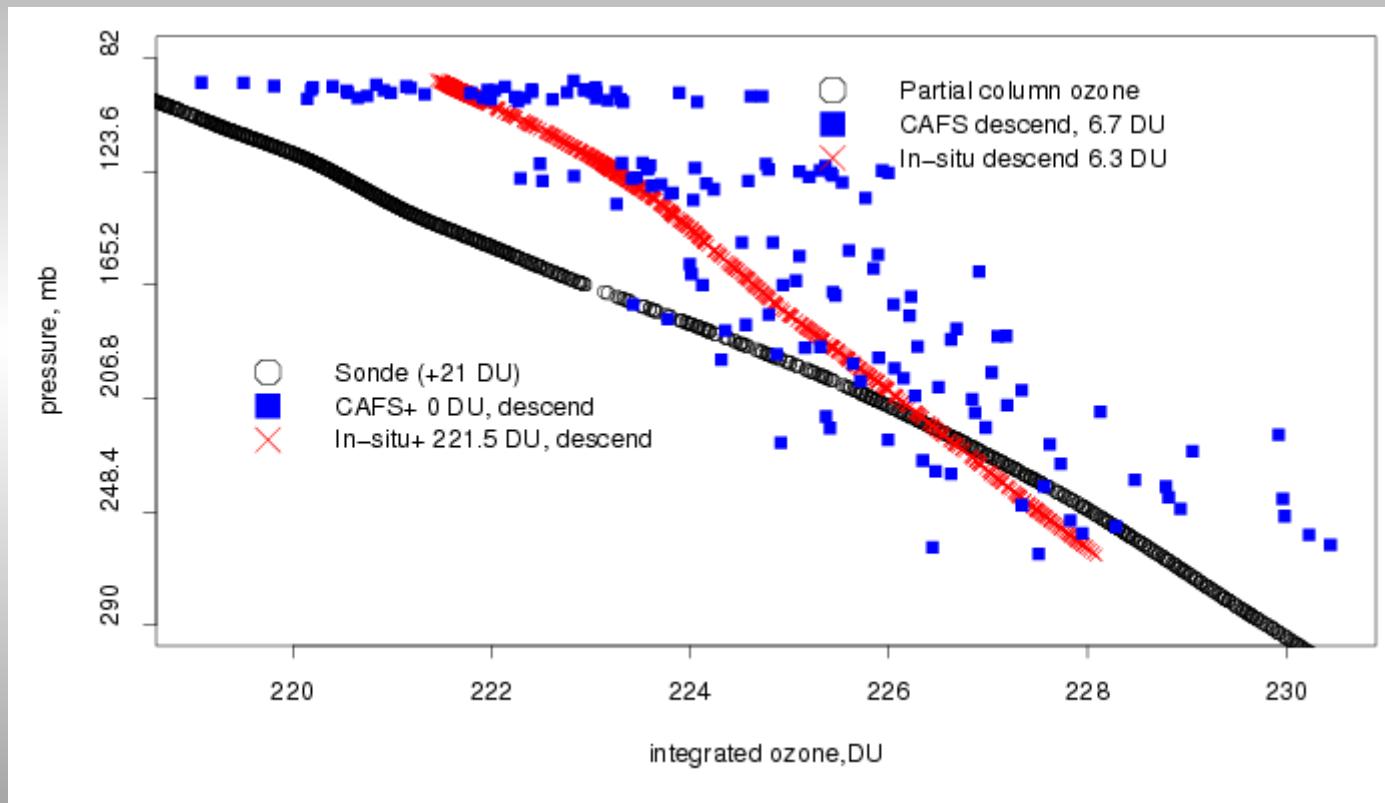
~-1.5 % offset
(microtops?)

~2.0 % STDev

Ozone integrated above aircraft pressure, CR-AVE 2006, January 19



Ozone integrated above aircraft pressure, CR-AVE 2006, January 22



CAFS measurement errors

- **Reference look-up tables against CAFS data:** use of the independent ozone data and ATLAS solar flux data – removes spectral offsets
- **Measurement noise:** point to points variability across the MLS footprint (~1200 sec) is small (<0.5 %)
- **Band-pass uncertainty:** negligible effect on retrieved ozone
- **Spectral shift in wavelength registration due to instrument temperature instability:** 0.1 nm shift causes ~5 % increase in retrieved ozone column above 18 km (some SZA effect) – needs further investigation, better temperature control of the instrument will be attained in the future flights

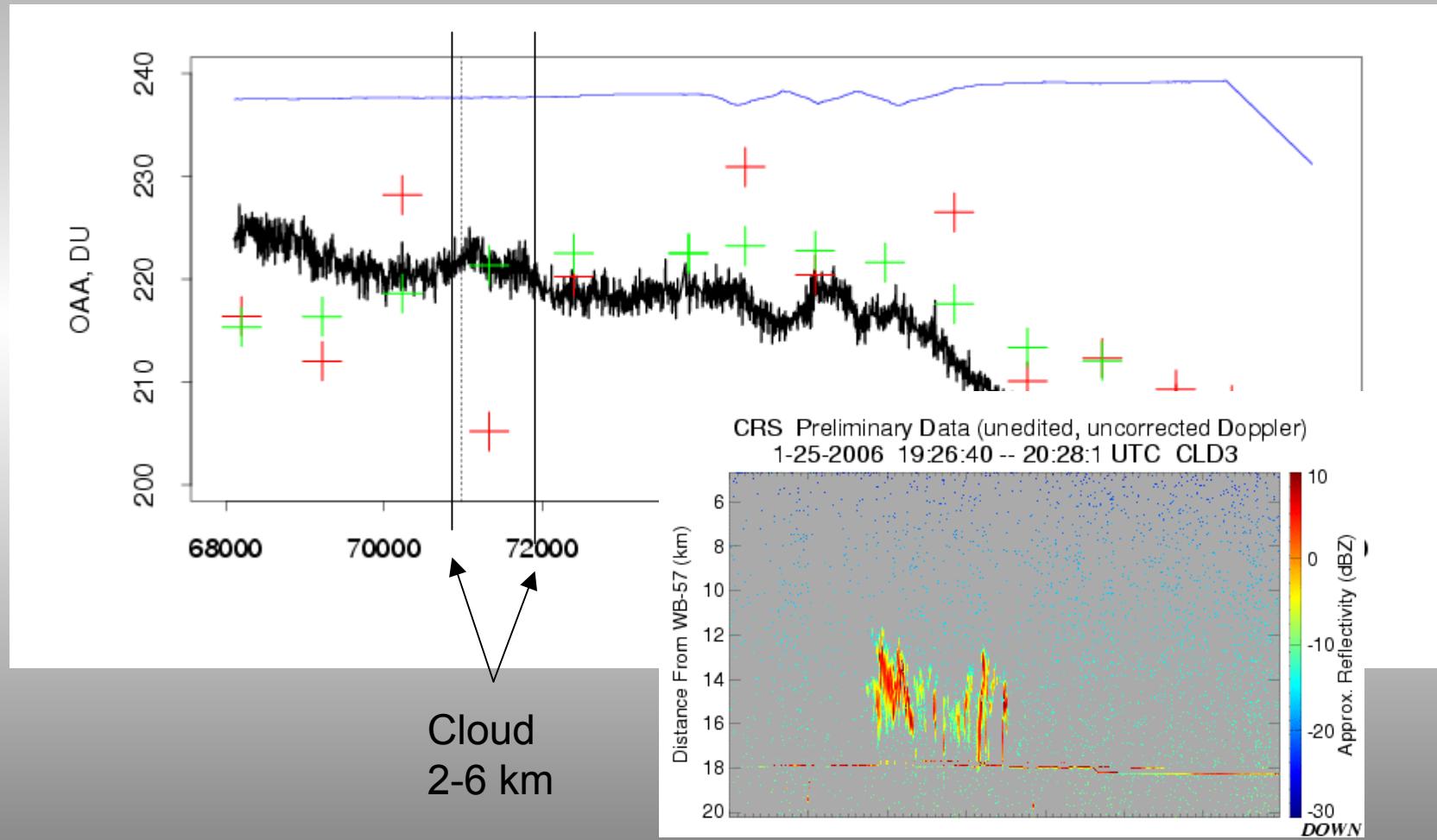
CAFS retrieval errors

- **Choice of ozone cross-sections:** (< 1.5 %).
- Temperature profile: < 2 % at 18 km
- **CAFS profile sensitivity** (AK and difference between MLS and standard O₃ profiles): -2 % <errors < 4 % (SZA)
- **Underlying reflectivity** at 360 nm (clouds/snow):

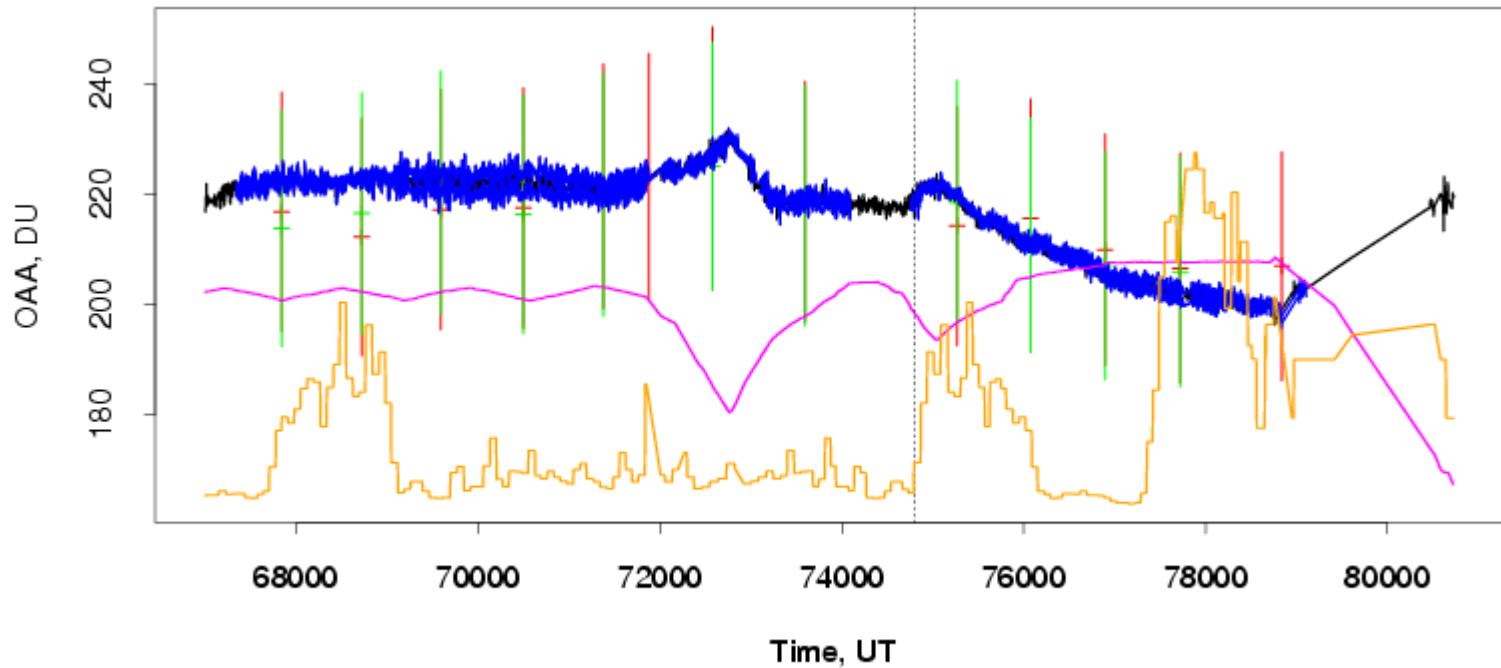
Simulations: < 2 % errors at 18 km above homogenous cloud layer (30 optical depth) located between 4-6 km and between 10-12 km

Observations: similar effect is found during CR-AVE flights, where clouds are detected by CRS instrument that measures reflectivity below the WB-57 aircraft

Clouds and CAFS, Jan 25

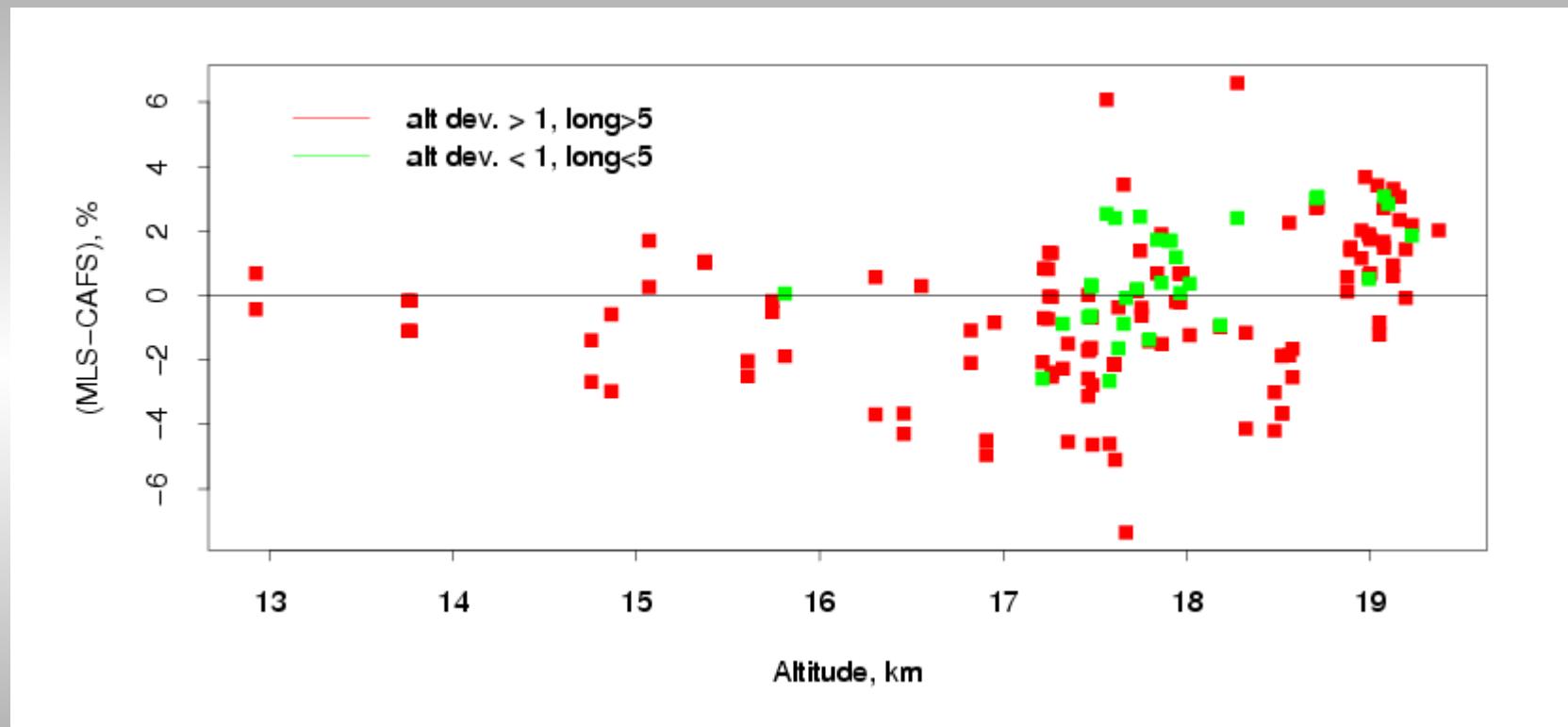


MLS/CAFS, Jan 22, 2006

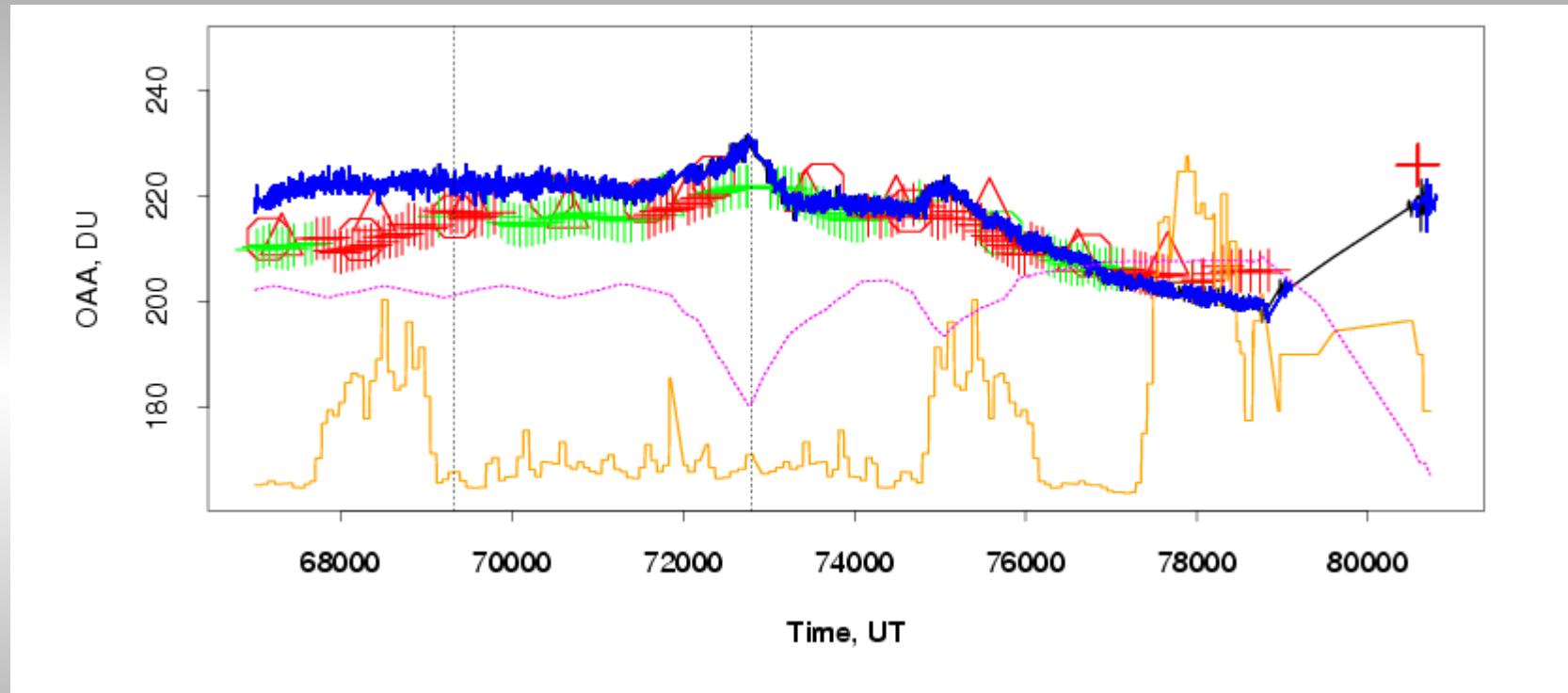


CAFS (errors), MLS (close, far), altitude, OMI reflectivity at 360 nm

MLS/CAFS summary, Jan 2006

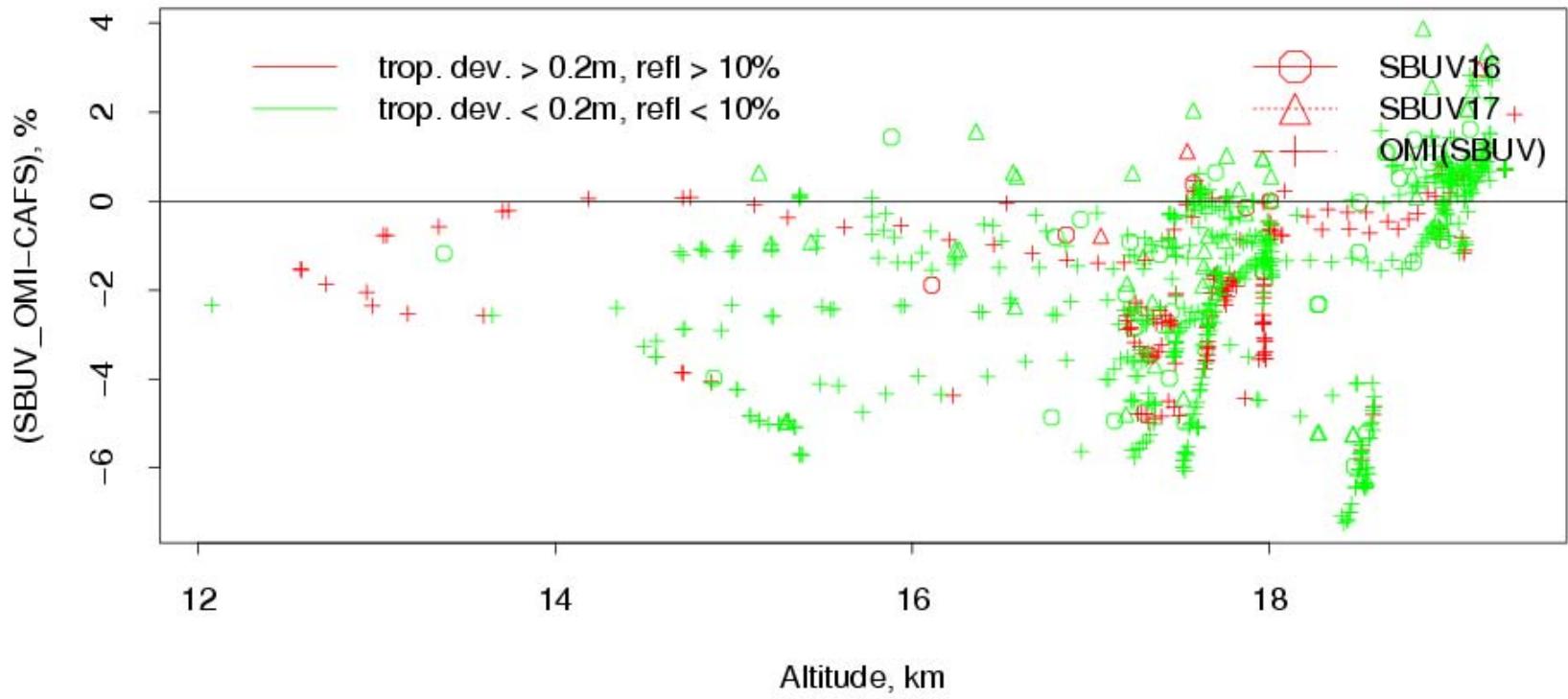


SBUV/OMI vs CAFS, Jan 22, 2006



CAFS (errors), SBUV-16, SBUV-17, SBUV-OMI, altitude, reflectivity

SBUV/OMI vs CAFS, 2006



Conclusions

- CAFS continues to provide reference for stratospheric ozone column products (MLS, OMI/SBUV) with better than 2 % accuracy.
- Summary of CAFS error is complete and available upon the request.
- Two (or more) papers are in preparation: instrument description, algorithm, validation